

Application No.: 10/598,053
Amendment Dated April 21, 2010
Reply to Office Action of December 22, 2009

REMARKS

This amendment is submitted along with a request for a one month extension and appropriate fee in reply to the Office Action dated December 22, 2009. Claims 1-11, 14-19, 22, 25, 26 and 29-31 currently stand rejected. Applicants have amended independent claim 22 for clarity. Dependent claims 2, 8, 9, 15 and 26-30 have been amended to correspond to changes in independent claim 22. No new matter has been added by the amendment. Claims 12, 13, 20 and 21 have been withdrawn due to a restriction requirement. Claims 1, 4 and 25 have been canceled, without prejudice. Claims 23 and 24 were previously canceled.

Applicants appreciate the Examiner's indication that claims 27 and 28 would be allowable if rewritten in independent form including their corresponding base claims and any intervening claims.

In light of the amendment and the remarks presented below, Applicants respectfully request reconsideration and allowance of all now-pending claims of the present application.

Claim Rejections - 35 USC § 102

Claims 1-11, 14-19, 22, 25, 26 and 29-31 currently stand rejected under 35 U.S.C. §102(b), as being anticipated by Ely et al. (U.S. Patent No. 6,118,271, hereinafter "Ely"). Claims 1, 4, 22, 25 and 26 currently stand rejected under 35 U.S.C. §102(b), as being anticipated by Spies (DE 19621886). Claims 1, 4 and 25 have been canceled, without prejudice, and thus the rejections of these claims are now moot.

Independent claim 22 recites, *inter alia*, a processing circuit operable to process sensor signals generated in the one or more sensor windings which are at substantially the same frequency as said excitation frequency, to determine a value of a ratiometric function, which value is indicative of the relative position between the first and second relatively movable members. Applicants respectfully submit that the cited references, alone or in combination, fail to teach or suggest this feature and specifically fail to teach or suggest the processing of sensor signals generated in the one or more sensor windings, which are at substantially the same frequency as said excitation frequency, to determine a value of a ratiometric function.

Ely describes a “fluxgate” type position sensor. Sensors of this type operate by driving a magnetically permeable film into and out of saturation. Figure 4 of Ely illustrates the signals that are employed in the sensor used and described in Ely. In particular, Figure 4A of Ely illustrates the drive current (I_e) which is shown as being a triangular wave. Figure 4B illustrates the EMF generated in the sense coil. As discussed in col. 10, lines 39 to 42 of Ely, the EMF induced in the sense coil 27 is a periodic square wave having a fundamental component (shown by the dashed line 41 in Figure 4B), whose frequency is twice that of the excitation current. The detection circuitry described in Ely is arranged to process this fundamental component of the sensed signal.

Figure 8 of Ely further confirms the conclusion presented above. In this regard, Figure 8 shows that the digital oscillator 81 generates a square wave signal at frequency $2F$, and this signal is passed through a frequency divider circuit 85 which divides the frequency of the signal by two before it is amplified for application to the excitation winding. The signal received from the sensor winding is then amplified by the amplifier 93 and thereafter is mixed by the original double frequency signal generated by the digital oscillator 81. Accordingly, Applicants respectfully submit that it is clear that Ely fails to teach or suggest a processing circuit operable to process sensor signals generated in the one or more sensor windings which are at substantially the same frequency as said excitation frequency, to determine a value of a ratiometric function, which value is indicative of the relative position between the first and second relatively movable members as provided in independent claim 22.

Although independent claim 22 is patentable over Ely for at least the reason provided above, Applicants further note that independent claim 22 has also been amended to clarify that the magnetic field generator is a DC magnetic field generator. Meanwhile, the Office Action refers to an embodiment of Ely in which an AC magnetic scale is used to define the positionally varying magnetic field. The fact that Ely relates to an AC magnetic scale used to define the positionally varying magnetic field while the claimed invention provides that the magnetic field generator is a DC magnetic field generator is further evidence that Ely fails to teach or suggest the claimed invention.

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Spies also relates to a fluxgate sensor. However, Spies does not specify the frequency relationship between the excitation frequency and the sensing frequency. However, Spies does refer to EP 0191223 for further details of how such fluxgate sensors operate and EP 0191223 clearly states on page 3 lines 5 to 14 that the signal generated in the sensor windings of such fluxgate sensors is at twice the frequency of the excitation signal. Thus those skilled in the art would also understand from Spies that the signal that is processed is at twice the frequency of the excitation signal. Accordingly, Spies also fails to teach or suggest a processing circuit operable to process sensor signals generated in the one or more sensor windings which are at substantially the same frequency as said excitation frequency, to determine a value of a ratiometric function, which value is indicative of the relative position between the first and second relatively movable members as provided in independent claim 22.

Although Spies and Ely have not been cited in combination, Applicants still respectfully note that even if Spies and Ely were cited in combination with each other, such combination would still fail to teach or suggest a processing circuit operable to process sensor signals generated in the one or more sensor windings which are at substantially the same frequency as said excitation frequency, to determine a value of a ratiometric function, which value is indicative of the relative position between the first and second relatively movable members as provided in independent claim 22. Accordingly, independent claim 22 is patentable over Spies and Ely, alone or in combination.

Claims 3, 5-11, 14-19, 26 and 29-31 depend either directly or indirectly from independent claim 1, and thus include all of the recitations of their corresponding independent claims. Dependent claims 3, 5-11, 14-19, 26 and 29-31 are therefore patentable over Spies and Ely, alone or in combination, for at least the same reasons given for independent claim 1.

Accordingly, for all of the reasons stated above, Applicants respectfully submit that the rejections of claims 3, 5-11, 14-19, 22, 26 and 29-31 are overcome.

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CONCLUSION

In view of the amendment and remarks submitted above, it is respectfully submitted that the present claims are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present invention.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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